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ABSTRACT

The purpose of this study was to develop inventory items that measure the study habits and behaviors of adult students from a variety of college settings. There were two specific objectives: (1) to acquire as large and heterogeneous a sample as possible in order to factor out significant study behavior constructs for building a diagnostic and predictive instrument; and (2) to contribute to research on metacognitive processes of adult students. The 46-item Study Behavior Inventory, Form D (SBI-D) is a third revision developed from Wrenn's Study Habits Inventory (1941). It was intended to measure three major factors: (1) general study habits and behaviors; (2) reading and note-taking techniques; and (3) coping with examinations. Data were collected from 1,052 students from seven schools. Descriptive and factor analyses were done with the Statistical Package for the Social Sciences. A test-retest-reliability study conducted with 62 Northern Illinois University students indicated a high degree of short range consistency. Factor analysis identified significant items. Internal consistency techniques established the reliability of the total inventory and item subscales. Best and poorest items were identified to provide an objective basis for future revision decisions. (BS)

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Building an Instrument to Measure Study Behaviors and Attitudes: A Factor Analysis of 46 Items

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I. Introduction

Educational researchers and the public alike are developing a strong interest in the subject of study skills. "Metacognition"—the understanding and control of one's own learning strategies—is emerging as a prominent part of the study of cognition. Current textbooks, for example, cite a growing body of research on this subject. Those who teach are already aware that good study habits are the major factor that contributes to effective learning at virtually all levels. In fact, many achievement outcomes that are often attributed to natural ability may be better attributed to superior study skills.

Researchers are focusing on the total age range of the metacognitive process, from "metamemory" and "metalanguage" processes that begin around the age of 5, all the way to the measurement of specific study attitudes and strategies of mature adults who have returned to school for academic vocational enrichment.

Purpose of the Study. The purpose of this study was to develop inventory items that measure the study attitudes and behaviors of adult students from a variety of college settings. Specifically, the investigator had two objectives: (1) to acquire as large and heterogeneous a sample as large as possible in order to factor out significant study behavior constructs for the purpose of building a practical instrument for both diagnostic and predictive uses: and, (2) to contribute to research on the metacognitive processes of adult students.

Methods and Procedures The instrument used in this study is the Study Behavior Inventory, Form D, developed by the author. 1,052 subjects responded to the 46-item instrument during the winter of 1983-84. Included, also, were demographic items and attribute variables requested by the participating schools. Participants included 3 community colleges located in the West Chicago suburban area, a 4-year, liberal arts college, Northern Illinois University, and a community college in the Caribbean. Descriptive and factor analyses were done by means of Northern Illinois University's mainframe computer facilities, utilizing the Statistical Package for the Social Sciences (SPSS-X). Contrary to what was anticipated, analysis of the data showed a high degree of homogeneity among the seven schools. The range of total scores on the SBI for all schools was a narrow 124 to 131.

Study Behavior Inventory, Form D.* The SBI-D is the third revision of an instrument first developed by C. Gilbert Wrenn, which was intended for counseling purposes (1941). The author administered a revised version—Form B—to Northern Illinois University students in 1982, which led to the next revision—Form C. This expanded version was the basis for an extensive study with 3,078 students in a community college in a Chicago Suburb in Spring, 1983. At this time, items relating to test anxiety and coping skills were added.

Form D. is a 46—item scale that was intended to measure three major factors, or constructs: (1) General Study Habits and Behaviors: (2) Reading and Note-taking Techniques; and, (3) Coping with Examinations. Factor analysis was performed in order to determine if the factor

*See Appendix A.

loadings on various items were in agreement with the results of logical item-cluster analysis, or face validity. The SBI-D is a 4-response scale similar to a Likert scale, ranging in response from favorable to unfavorable, or agreement to disagreement.

In addition, a test-retest reliability study was conducted with 62 NIU students who responded to the SBI on two occasions—the second time approximately two to three weeks after the first. The result was a Pearson product-moment correlation coefficient of .94, indicating a high degree of short-range consistency.

II. Review of the Literature

The balance of research supports the common assumption by teachers that the better organized student will perform better. However, most of the investigations do mention the importance of motivation. A recent study has discovered that changes in motivation and study methods tend to parallel rather than precede changes in academic performance (Main, 1980).

The suggestion seems to be that while motivation, study methods, and performance are interrelated, the effect of one upon the other is very hard to establish. In another study reported by Main (1980) it appears that there are a variety of different profiles of the successful student. They suggest that these are based on different combinations of motivation, study methods, personality characteristics, academic skills, and home or personal background factors. In their work, they established that generally the high attainment groups of students are characterized

by high motivation and good study methods.

Miller and Parlett, (1975) who did a major review of success and failure in higher education support the idea that the amount of time spent in private study is important for success. They reported that the amount of time spent is probably a useful index of motivation. but the more motivated student also probably spends his time more effectively. The investigators conclude that there is no clear evidence as to what the best method of study is. They suggest that probably no single technique applies to all individuals.

There is now a good deal of research which shows that some study skills and habits are important for success, but they are not overwhelmingly important in themselves. They seem to have their effect when coupled with certain positive attitudes toward learning with other personal attributes. Some non-intellectual factors that the student with good study skills possesses are: socialization, maturity, responsibility, achievement. potential, intellectual efficiency, and self-control. He/she also tends not to procrastinate, has an active and participative temperment, shows tolerance, and is resourceful, well-organized, and methodical. According to Brown and Holtzman, (1966) good students have positive study habits together with moderately high motivation to succeed, a ready acceptance of the ethos of the school, and a desire for teacher approval, make for success.

One approach in research on study skills has tended to focus on four major areas: (1) grades; (2) attrition-retention; (3) successful programs;

and, (4) learning styles.

Subject and Performance-related Factors: Grades. It would seem reasonable to expect that the student who studies more effectively will have higher grades than the student who studies less effectively. This generalization was confirmed for freshmen (Gallesich, 1970) and for black students (Levine, 1976). This finding was also confirmed with samples that represent entire student populations (Educational Testing Service, 1968; Kirkland and Hollandsworth, 1979; McCausland and Stewart, 1974; Lin and McKeachie; 1970; Ramist, 1981; Robyak and Downey, 1979; Wikoff and Kafka, 1981; and Wittmaier, 1972).

Attrition-retention. Since effective study habits are positively associated with grades, it is reasonable to expect that students having better study habits would tend to persist in college and students having poorer study habits would tend to drop out of college. The study habits versus attrition relationship has been confirmed by research (Demitroff, 1974; Katz, 1980; Ramist, 1981; Steele, 1978; and Timmons, 1977). Furthermore, Stone and Ryan (1964) found that high school study habits are associated with college freshman attrition. This findings suggest that study habits from past experience carry over to the future study situation.

Successful programs. While poor study habits tend to be carried over from high school to college, the behavior can be remediated. Examples of successful study habits programs include such approaches as individual peer interaction (Gadzella, 1979), student groups (Gadzella and Goldston, 1977), group counseling (Rubin and Cohen, 1974) and formal programs and classes (Hall, 1982; Silverman and Riordan, 1974; Trapey and Harris, 1979). In addition, Archer and Neubauer (1981) developed a successful peer model program which was funded at minimal cost.

Since most, if not all, study habits programs cited above involve voluntary student participation, the needs of those most likely to seek services should serve as the major focus of program development (Scigliano and Scigliano, 1979). Roby (1978) suggests an objective survey approach as a basis for programmatic development, but colleges and universities have tended to neglect affective domain measures (Hunter, 1979). However, Seni, et al., (1978) argue that students' perceptions of their study habits and attitudes are an important factor in programmatic development.

Two additional suggestions have been offered concerning the development of the program. The strengths of the participants should be the building blocks for enhancing their growth (Lindquist, 1981) and the program should use an holistic approach (Rutkowski and Domini, 1975).

Learning Styles. With the advent of new educational technology based upon television, programmed learning, and computer-assisted instruction, studying has become less distinct from the instructional process itself and more intertwined with the initial presentation of subject

matter (Encyclopedia of Educational Research, 1982).

Various authorities—Ausubel and Bruner, for examples—have sought to increase learning and retention by means of such techniques as "advance organizers" and the "inquiry method." In this context, numerous investigations have centered on the cognitive style of a given student, on the grounds that the learner receives and encodes information in any one of various ways and that an understanding of cognitive style is essential to methodology (Messick, 1976).

Parlett (1970) makes a distinction between students who are syllabus-bound and those who are syllabus-free. The former operate best within a given syllabus; if it is ill-defined, or sparse, they find it difficult to know how to study the content, and they tend to be less effective learners. The latter operate better when they can pursue their own lines of study, and they often feel restricted or intimidated by course requirements. Syllabus-bound students tend to need exams in order to study, do not read very widely beyond specific requirements, attend class very regularly and often have very conscientious study habits. Syllabus-free students, however, may spend too much effort on some aspects of their studies because they become intrinsically involved, but they tend to be adventurous or experimental.

These two roles imply a degree of dependence on or independence of teachers. Miller and Parlett (1975) describe three interesting short-hand descriptions of student behaviors:

1. Cue-seekers: Students who actively elicit from their teacher an understanding of the structure of a course or an examinable subject.

2. Cue-conscious students: Students who are able to pick up those hints about structure which are passed on by teachers.

3. Cue-deaf students: Students who are unable to pick up those hints about structure which are passed on by teachers.

Miller and Parlett (1975) describe the cue-seeking students as those who define courses and examinations as problem-situations and in an effort to find an affective way to solve a problem, use an intelligent, adaptive, and realistic strategy.

Another approach to the question of cognitive style is comparing courses that are instructor-centered and lecture-oriented with student-centered discussions. Krumboltz and Farquhar (1957) compared these two extremes and a third more eclectic method with interesting results. Regardless of actual instruction provided, students who originally expressed a preference for cognitive objectives showed a marked rise in scores on the Brown & Holtzman (1966) Survey of Study Habits and Attitudes instrument (SSHA) after the course, whereas scores for those who expressed a preference for affective, or student-centered instruction dropped significantly. The investigators believe that such interactions between attitude or personality traits and type of instruction are probably more commonplace than is generally realized.

Bruner (1966) has focused on a basic principle in many of his writings which is applicable to the study of study skills: learning is more effective when there is a structure around which materials or ideas can be organized. Two dimensions of that structure are relevant:

1. The student's learning style.
2. The depth, complexity, and organization of the task (Bruner, 1966).

The question arises as to the desirability of always seeking to effect a match between educational treatment and learners' characteristic styles. While a prolonged mismatch is clearly undesirable, some educators feel a responsibility to expose learners for short periods in instructors, approaches, environments, and methodologies that are not in line with learners' preferences and strengths. Some feel that this will help to accommodate (i.e., to develop flexibility); there is evidence that higher levels of learning style flexibility result in higher achievement levels (Kirby, 1979). Others feel that deliberate mismatching may help to foster creativity in learning and problem-solving.

Many writers maintain that failure to factor style into the teaching-learning equation has been a major weakness in education: "...the quality and durability of learning are critically dependent upon whether the teaching strategy is matched to the individual (style)" (Hamkins, 1974, p. 409). For example, a multiple-choice test may well give an advantage to persons who prefer a narrow range of categories for response and tend to search carefully for exact solutions (Kirby, 1979). The schools have been called places where "convergent" thinkers are rewarded while "divergent" thinkers are disapproved and suppressed for tendencies to pursue their own problems or approach them in idiosyncratic ways (Moore, 1972). Further, it has been suggested that instruction in higher education has favored the field-independent (Cross, 1976). An in-depth review of the research finds some instructional variation to be distinctly bad for a fraction of the learners with some treatments benefiting one subgroup while producing negative effects for another (Cronbach

and Snow, 1977, p. 391). Describing the great effort by schools to improve instruction by individualizing it, one publication sums up the position of those who feel that style can no longer be ignored:

> These efforts ranged from programmed learning to flexible scheduling, and from computer-assisted instruction to inter-active television. While these programs—and others—enjoyed some success, the general reaction among practitioners was one of disappointment. No one model appeared to be superior. Student achievement tended to remain constant whether schooling was structured or unstructured. Student attitudes and motivation blew hot and cold depending on the approach.
>
> With the benefit of hindsight, we now see that part of the problem was the tendency to apply a single approach to all students. That is, all students were expected to blossom under independent study or small-group discussion or open classrooms, or whatever. Student learning style challenges this premise and argues for an eclectic instructional program, one based upon a variety of techniques and structures reflecting the different ways that individual students acquire knowledge and skill (NASSP, 1979, p. 1).

With adults, examples of the consequences of failure to take learning style into account come from several recent studies. One involved 206 people preparing to take the General Educational Development (GED) test of high school equivalency. The study revealed that the field-dependent person is apparently at a disadvantage in taking this important exam despite the fact that more field-dependents that field-independents take it (Loveall, 1979). Another produced findings that prompted the investigators to say that those preparing learners for the GED test may well be conducting an educational experience that is difficult and frustrating for the field-dependent learner (Donnarumma, et al., 1980). Finally observing English as a second language classes composed of Laotian students, Lert found that cross-cultural insensi-

tivity to learning style was apparently responsible for the students' lack of progress:

> I observed an atmosphere of tension and disorientation in the classroom which...I felt to be symptomatic of a cultural clash...(resulting from) a lack of awareness Anglo teachers and administrators had regarding the students' preferred learning techniques. These included mimesis, identification with teacher, peer communication, and group cooperation and support (Lert, 1980, p. 58).

III. Development of Diagnostic Instruments

A useful approach in study skills research has been the comparison of good and poor students by means of questionnaires, interviews, or direct observation. Taking advantage of prior empirical studies, Brown and Holtzman (1966) developed the original Survey of Study Habits and Attitudes (SSHA). Data were compiled on study habits, studies using observational and interview techniques, and reports of related experiments in the field of learning. Scoring keys based on validity studies in ten colleges were developed, with one-semester grade averages as a criterion. Average validity coefficients for these widely different colleges were .42 and .45 for men and women, respectively. Low correlations with scholastic aptitude made it possible to increase the accuracy of prediction appreciably for college grades by adding scores from the SSHA (1966; Holtzman, Brown & Farquhar, 1954).

The desirability of a standardized version of the SSHA for junior and senior high school students as well as for college students and the value of subscales for diagnostic and counseling purposes spurred the

development of two revised editions: Form C for college (Brown and Holtzman, 1966) and Form S for high school (Brown and Holtzman, 1966). While retaining all previously significant items, both forms were expanded to 100 items grouped into four basic scales: Delay Avoidance, Work Methods, Teacher Approval, and Educational Acceptance. Additional reliability, validity, and normative studies are reported in the SSHA manual based on national samples of 3,054 college students and over 11,000 junior and senior high school student for Forms C and S, respectively.

Another major contribution to the development of instrumentation with respect to the measurement of study skills and habits was the Study Habits Inventory published in revised form in 1941 by C. Gilbert Wrenn. His purpose reflected the general interest at that time in isolating the factor of study habits and its analysis with reference to high and low scholarship. In order to do this, Wrenn made an analysis of the study habits associated with "successful" and "unsuccessful" academic careers of University of Minnesota men and women students.

Wrenn's Study Habits Inventory contained 28 total items, divided into four subareas: Reading and Note-taking Techniques, Habits of Concentration, Distribution of Time and Social Relationships in Study, and General Habits and Attitudes of Work. The SHI proved to have sufficient validity to be used as a diagnostic tool for counseling purposes, specifically in higher education. Its strength is in its application to the measurement of study skills in relationship with academic output. Its weakness—for today's needs—is that it did not

focus specifically on testing techniques and test anxiety and their relationship to academic success. Furthermore, although Wrenn's instrument was valid for the measurement of study skills of traditional, four-year, academically-oriented university students, it probably is less applicable to today's community college student.

With respect to instrumentation for the purpose of diagnosing and measuring study skills, it should be noted that the major focus of most research has been toward their use in counseling intervention on a case-by-case basis (i.e., Apps, 1981, 1978; Maxwell, 1979). Maxwell (1979) offers a list of frequently used psychometric instruments for the purpose of assisting individuals in counseling situations. Buros (1959, 1961, 1965, 1972, 1974, 1978) presents reviews of most of the diagnostic instruments cited by Maxwell (1979), as well as additional tools. None of the available psychometric instruments was designed for the purpose of this study, namely, to provide data for the improvement of classroom learning.

Thus we have seen that a rapidly growing body of instruments for diagnosing learning styles is now available for instructional and research purposes. Educational institutions are mobilizing to take learning styles into account, in designing curriculum and instructional systems.

In summary, it is clear that success in academic work involves efficient study skills. Students generally feel competent in the manageable activities of attending classes and examinations, and they feel compe-

tent at handing in assignments on time, organizing lecture notes for future use, and seeking help with study problems. However, they do not feel competent at all in activities such as using study time effectively, reading rapidly with comprehension, taking examinations, writing clearly, and recalling important points from course content.

IV. Results of the Study

The analysis of the data comprised three stages:

1. Significant items were identified through factor analysis—the application of mathematical principles to complement common-sense notions toward related item cluster.

2. The reliability of both the total inventory and item subscales was established through internal consistency statistical techniques, which were further supported by the evidence in the test-retest analysis cited above.

3. The discriminating power of the SBI-D was enhanced by the identification of the best as well as the poorest items. This provides an objective basis for decisions on which items to throw out, enhance by adding similar ones, or perhaps add as items for additional factors to be included in the inventory as a whole.

The factor analyses were conducted using the item mean value substitution for missing-item data. Even though a factor analysis that excluded missing data yielded nearly identical statistics, the value of substituting at most 1 or 2 approximations within only 105 subjects far outweighed the loss of 44 or 45 valid pieces from the data set, in the opinion of the investigators.

The factor criterion was iteration. Extraction was principal components (PC), and rotation was varimax. This methodology is consistent with current factor analytic principles within the domain of test construction theory. The factor loadings cutoff level was set at 0.4000 for all factors. (Note: The PC loadings were contrasted with

rotated loadings in order to identify the less obscure and most appropriate factor, in construct relationship for each of the items.

1. Factor 1 explains 17.6% of inventory variance (SBI items 22, 28, 32, 33, 34, 35, 39, 41, 42, 43, 45, and 46). These items are almost entirely self-critical and in some cases self-depracting. Apparently, respondents were consistent in reacting to stimuli that suggested inadequacies in study skills, which means that the SBI-D may be tapping an underlying concern or concerns not easily articulated by students and which may be related to anxiety.

2. Factor 2 explains 7.7% of the inventory variance (SBI items 1, 2, 4, 5, 7, 9, 15, 16, 17, 18, 19, 29, and 31). These items are a mixture of self-critical and constructive study practices. It appears that subjects responded quite consistently to the worrisome items, and then proceeded to list all their good study practices. (Interestingly, this factor includes an item lamenting too much time watching TV). The content of these items suggest a construct having to do with time management.

3. Factor 3 explains 4.2% of the inventory variance (SBI items 5, 17, 23, 26, 36, and 37). These are largely positive items, including three that are "I try to..."type-items, suggesting a construct related to specific ways of studying, or perhaps, metacognitive processes.

4. Factor 4 explains 4.0% of the inventory variance (SBI items 4, 6, 12, 14, and 30). This factor contains a combination of both positive and negative attitudes similar to many of the items in Factors 1 and 2, but which apparently contain different semantic content.

All of these data obtained from rotated loadings. This technique ensures that inventory items that meet the cutoff level and that demonstrate a conventional relationship to one and only one factor (construct) are identified for interpretation. The remaining items, with respect to statistical evidence, were either too semantically obscure or too trivial to impact on any other factor. However, the items that comprise Factors 2, 3, and 4 should not be totally abandoned.

The relatively high alpha values for these items indicate that they are consistent with the general theme of the inventory as a whole. In other words, they tend to represent a homogeneous sample of the entire inventory item domain.

Reliability Analysis. Interpretations were made from covariance and Cronbach alpha internal consistency statistical routines. The reliability data, however, were generated by a descriptive statistical program developed by the investigators, rather than by means of existing inferential packages.

1. Total test: n=946; Cronbach's alpha=0.8700; least productive: Items 3 and 8.

2. Factor 1: n=946; Cronbach's alpha-0.8437; least productive: Item 43.

3. Factor 2: n=946; Cronbach's alpha=0.7969; least productive: Items 5, 17, and 19.

4. Factor 3: n=946; Cronbach's alpha=0.6711; least productive items: None.

5. Factor 4: n=946; Cronbach's alpha=0.5620; least productive: Item 6.

V. Conclusions

Deleting items other than 3, 8, 43, 5, 17, and 19 might seriously diminish both item and total inventory variances, while holding covariances constant. This could cause Cronbach alpha measure to suffer without any statistical justification for their removal. It is clear from this analysis that many of the SBI-D items are excellent as a basis for building

a study skills instrument.

The development of a psychological instrument such as the Study Behavior Inventory must, of course, be thoroughly grounded in common sense as well as empirically-based evidence from the classroom. However, the availability of various factor analysis procedures via computerized, statistical packages certainly adds an exciting dimension to the instrumentation process. By repeated samplings in the classroom with large and diverse populations followed by the various factor analysis procedures now coming on line, there is real potential for developing finely-honed diagnostic and predictive instruments for both research purposes and the needs of participating schools.

Bibliography

Apps, J. W. (1978). Study skills for adults returning to school (2nd ed.). New York: McGraw-Hill.

Apps, J. W. (1981). The adult learner on campus: A guide for instructors and administration. Chicago: Follett.

Archer, J., Jr., and Neubauer, T. (1981). Study skills on a shoe string. NASPA Journal, 18, 48-52.

Brown, W. F. and Holtzman, W. H. (1966). Survey of study habits and attitudes. New York: Psychological Corporation.

Bruner, J. S. (1966). Toward a theory of instruction. Cambridge, Mass.: Belknap Press.

Buros, O. K. Tests in print. Highland Park, N. J.: Gryphon Press.

Buros, O. K. (1974). Tests in print II. Highland Park, N. J.: Gryphon

Buros, O. K. (1978). The eighth mental measurement yearbook. Highland Park, N. J.: Gryphon Press.

Buros, O. K. (1959). The fifth mental measurement yearbook. Highland Park, N. J.: Gryphon Press.

Buros, O. K. (1972). The seventh mental measurement yearbook. Highland Park, N. J.: Gryphon Press.

Buros, O. K. (1965). The sixth mental measurement yearbook. Highland Park, N. J.: Gryphon Press.

Cronbach, L. J. and Snow, R. E. (1977). Aptitudes and instructional methods. New York: John Wiley.

Cross, P. K. (1976). Accent on learning. San Francisco: Jossey-Bass.

Demitroff, J. F. (1974). Student persistence. College and University, 49, 553-567.

Donnarumma, T., et al. (1980). Success in a high school completion program and its relation to field dependence-independence. Adult Education, 30, 222-232.

Educational Testing Service. (1968). Technical manual: College student questionnaires. Author: Princeton University.

Encyclopedia of Educational Research. (1982). New York: Macmillan.

Gadzella, B. M. (1979). The effects of student-to-student counseling on students' perceptions of study habits and attitudes. Journal of College Student Personnel, 20, 424-430.

Gadzella, B. M. and Goldston, J. (1977). Effects of study guides and classrooms discussions on students' perceptions of study habits. Perceptual and Motor Skills, 44, 901-902.

Gallesich, J. (1970). An investigation of correlates of academic success of freshmen engineering students. Journal of Counseling Psychology, 17, 173-176.

Hall, B. (1982). College warm-up: Easing the transition to college. Journal of College Student Personnel, 23, 280-281.

Hamkins, G. (1974). Motivation and individual learning styles. Engineering Education, 64, 408-411.

Holtzman, W. H., Brown, W. F., and Farquhar, W. G. (1954). The survey of study habits and attitudes: A new instrument for the prediction of academic success. Educational and Psychological Measurement, 14, 726-732.

Hunter, W. E. (1979). Noncognitive factors and student success in college. Community College Frontiers, 7, 44-47.

Katz, M. R. (1980). SIGI: An interactive aid to career decision making. Journal of College Student Personnel, 21, 34-39.

Kirby, P. (1970). Cognitive style, learning style, and transfer skill acquisition. Columbus, Ohio: National Center for Research in Vocational Education.

Kirkland, K. and Hollandsworth, J. G., Jr. Test anxiety, study skills, and academic performance. Journal of College Student Personnel, 20, 431-436.

Krumboltz, J. D. and Farquhar, W. G. (1957). The effect of three teaching methods on achievement and motivational outcomes in a How-to-Study course. Psychological Monographs, 71, 25.

Lert, C. N. (1980). Adult second language acquisition: Laotian Hmong (sic) in Southland. Master's thesis, Brown University, ED 190728.

Levine, F. J. (1976). Influence of field-independence and study habits on academic performance of Black students in a predominantely white university. Perceptual and Motor Skills, 42, 1101-1102.

Lin, Y. and McKeachie, W. J. (1970). Aptitude, anxiety, study habits, and academic achievement. Journal of Counseling Psychology, 17, 306-309.

Lindquist, J. (1981). Professional development. In Chickering, A. W. and Associates, The modern American college. San Francisco: Jossey-Bass.

Loveall, P. (1979). The relationship between cognitive style and achievement as measured by the old and new forms of the GED. Unpublished doctoral dissertation, Northern Illinois University.

Main, A. (1980). Encouraging effective learning. New York: Macmillan

Maxwell, M. (1979). Improving student study skills. San Francisco: Jossey-Bass.

McCausland, D. .F. and Stewart, N. E. (1974). Academic aptitude, study skills, and attitudes and college GPA. Journal of Educational Research, 67, 354-357.

Messick S. (Ed.) (1976). Individuality in learning. San Francisco: Jossey-Bass.

Miller, C. M. and Parlett, M. (1975). Up to the mark. London: Society for Research into Higher Education.

Moore, M. G. (1972). Learning autonomy: The second dimension of independent learning. Convergence, 5, 76-87.

Mueller, R. J. and Gibson, E. E. (1982). Study Habits Inventory. DeKalb, IL: Author.

National Association of Secondary School Principals. (1979). Student learning styles. Reston, VA: NASSP.

Parlett, M. (1970). The syllabus-bound student. In Hudson, L., The ecology of human intelligence. London: Penguin Modern Sociology Reading

Ramist, L. (1981). College student attrition and retention. Findings, 6, 1-4.

Roby, T. W. (1978). Problem situations and curricular resources at Central College: An exemplification of curricular arts. Curriculum Inquiry, 8, 95, 117.

Robyak, J. E. and Downey, R. G. (1979). A discriminant analysis of the study skills and personality types of underachieving and nonunderachieving study skills students. Journal of College Student Personnel, 20, 306-309.

Rubin, H. S. and Cohen, H. A. (1974). Group counseling and remediation: A two faceted intervention approach to the problem of attrition in nursing education. Journal of Educational Research, 67, 195-198.

Rutkowski, K. and Domini, G. (1975). Interrelationship of study habits and personality variables in college students. Journal of Educational Psychology, 67, 748-749.

Scigliano, J. A. and Scigliano, V. (1979). Persistence in the developmental studies. Planning and Changing, 10, 42-47.

Seni, C., Gadzella, B., Goi[illegible]ston, J. T., and Zimmerman, M. L. (1978). Differences and changes of internally-oriented students on study habits. College Student Journal, 12, 294-298.

Silverman, M. S. and Riordan, K. (1974). Study skills training for "high risk" freshmen. Journal of College Student Personnel, 13, 63.

Steele, M. W. (1978). Correlates of undergraduate retention at the University of Miami. Journal of College Student Personnel, 19, 188-189.

Stone, L. and Ryan, G. E. (1964). High school study habits and college freshman attrition. Personnel and Guidance Journal, 43, 188-189.

Timmons, F. R. (1977). Freshmen withdrawal from college: An empirical examination of the usefulness of "autopsy studies." Psychological Reports, 41, 672-674.

Trapey, E. R. and Harris, J. B., Jr. (1979). Study skills courses make a difference: Journal of College Student Personnel, 20, 62-66.

Wikoff, R. L. and Kafka, G. F. (1981). The effectiveness of the SSHA in improving prediction of academic achievement. Journal of College Student Personnel, 22, 162-166.

Wittmaier, B. C. (1972). Test anxiety and study habits. Journal of Educational Research, 65, 352-354.

Wrenn, C. G. (1941). Study Habits Inventory, Revised Edition. Stanford: Stanford University Press.

STUDY BEHAVIOR INVENTORY - Form D*

Richard J. Mueller

We would like to find out what study habits and skills you have developed at this stage in your college career. The purpose of our study is to help students develop better and more productive ways to study and to help both college and high school teachers do a better job of teaching.

All the information in this inventory will be kept in the strictest confidence, for research purposes only. So, please be frank and honest in your answers.

The following is a list of statements of habits and attitudes which may affect use of study time and consequent success in school work and study. Please state your habits with regard to these items, not in accordance with what you think you should or should not do, or what you see others do, but in accordance with what you yourself are in the habit of doing. Please answer all questions.

After each statement, you will find Columns 1, 2, 3, and 4. Mark each item either 1, 2, 3, or 4--whichever best describes your behavior. Remember: This is a survey of your present habits and attitudes of study. Check each item in accordance with the following key:

Column 1 - Rarely or never true in my case
Column 2 - Sometimes true in my case
Column 3 - Often or usually true in my case
Column 4 - Almost always true in my case

	1 Rarely or Never	2 Some-times	3 Often or Usually	4 Almost Always
I. GENERAL STUDY ATTITUDES AND BEHAVIOR				
1. My time is unwisely distributed; I spend too much time on some things and not enough on others	____	____	____	____
2. I find it hard to force myself to finish work by a certain time; work is unfinished, inferior, or not in on time	____	____	____	____
3. With some of my courses, I like to study with others	____	____	____	____
4. I complete my homework assignments on time . .	____	____	____	____
5. I try to carry over and relate material learned in one course to that learned in others	____	____	____	____
6. I copy the diagrams, drawings, tables, and other illustrations that the instructor puts on the blackboard	____	____	____	____
7. I keep my assignments up-to-date by doing my work regularly from day-to-day	____	____	____	____

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	1 Rarely or Never	2 Some-times	3 Often or Usually	4 Almost Always
8. I prefer to study alone rather than with others	____	____	____	____
9. At the beginning of a study period, I organize my work so that I will utilize the time most effectively	____	____	____	____
10. When I am having difficulty with my schoolwork, I try to talk over the trouble with the teacher	____	____	____	____
11. In preparing reports, themes, term papers, etc., I make certain that I clearly understand what is wanted before I begin to work .	____	____	____	____
12. When I get behind in my schoolwork for some unavoidable reason, I make up back assignments without prompting from the teacher	____	____	____	____
13. Difficulty in expressing myself in writing slows me down on reports, themes, examinations, and other work to be turned in	____	____	____	____
14. My teachers criticize my written reports as being hastily written or poorly organized . .	____	____	____	____
15. I lay aside returned examinations, reports, and homework assignments without bothering to correct errors noted by the instructor . .	____	____	____	____
16. My studying is done in a random, unplanned manner--impelled mostly by the demands of approaching classes	____	____	____	____
17. I try to do some "over-learning"--working beyond the point of immediate memory or recall	____	____	____	____
18. I put off writing themes, reports, term papers, etc., until the last minute	____	____	____	____
19. I watch too much television, and this interferes with my studies	____	____	____	____
20. I work too many hours for the course load I am carrying	____	____	____	____
21. Personal problems with my family affect my ability to concentrate on studying	____	____	____	____

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	II. READING AND NOTE-TAKING TECHNIQUES				
22.	I have to re-read material several times--the words don't have much meaning the first time I go over them	____	____	____	____
23.	I try to summarize, classify, and systematize the facts learned, associating them with previously learned materials and facts	____	____	____	____
24.	I skip over the figures, graphs, and tables in a reading assignment	____	____	____	____
25.	After reading several pages of an assignment, I am unable to recall what I just read	____	____	____	____
26.	When in doubt about the proper form for a written report, I refer to an approved model to provide a guide to follow	____	____	____	____
27.	When reading a long textbook assignment, I stop periodically and mentally review the main points that have been presented	____	____	____	____
28.	When writing down notes from a lecture, I have trouble picking out the important points: I tend to put down material which turns out to be unimportant	____	____	____	____
29.	After a class lecture, I go back and recite to myself the material in my notes--rechecking any points I find doubtful	____	____	____	____
30.	I keep all the notes for each subject together, carefully arranging them in some logical order	____	____	____	____
31.	Before attending class, I prepare by reading or studying the assignment	____	____	____	____
	III. COPING WITH EXAMINATIONS				
32.	I get nervous and confused when taking an examination and fail to answer questions to the best of my ability	____	____	____	____
33.	I do poorly on tests because I find it hard to think clearly and plan my work when I am faced with an exam	____	____	____	____

		1 Rarely or Never	2 Some-times	3 Often or Usually	4 Almost Always
34.	I have difficulty in picking out important points of a reading assignment--points that later appear on examinations	____	____	____	____
35.	I lose points on true-false or multiple-choice examinations because I changed my original answer only to discover later that I was right the first time	____	____	____	____
36.	I plan out in my mind the answer to subjective or essay-type examination questions before starting to write the answer	____	____	____	____
37.	When preparing for an examination, I learn facts in some logical order of importance, order of presentation in class or textbook, order of time in history, etc.	____	____	____	____
38.	I am careless with spelling and mechanics of English composition when answering examination questions	____	____	____	____
39.	Although I work until the last possible minute, I am unable to finish examinations within the allotted time	____	____	____	____
40.	If time is available, I take a few minutes to check over my answers before turning in my examination paper	____	____	____	____
41.	When tests are returned, I find that my grade has been lowered because of careless mistakes	____	____	____	____
42.	During an examination, I forget names, dates, formulas, and other details that I really do know	____	____	____	____
43.	I believe that grades are based upon a student's ability to memorize facts rather than upon the ability to "think things through"	____	____	____	____
44.	I study harder for final exams than for the rest of my coursework	____	____	____	____
45.	I think I could do much better on tests if I could take them alone and/or not feel pressured by a time limit	____	____	____	____
46.	Worrying about how well I will do interferes with my preparation and performance on tests	____	____	____	____